More on the omega – some better rates/trigger counts

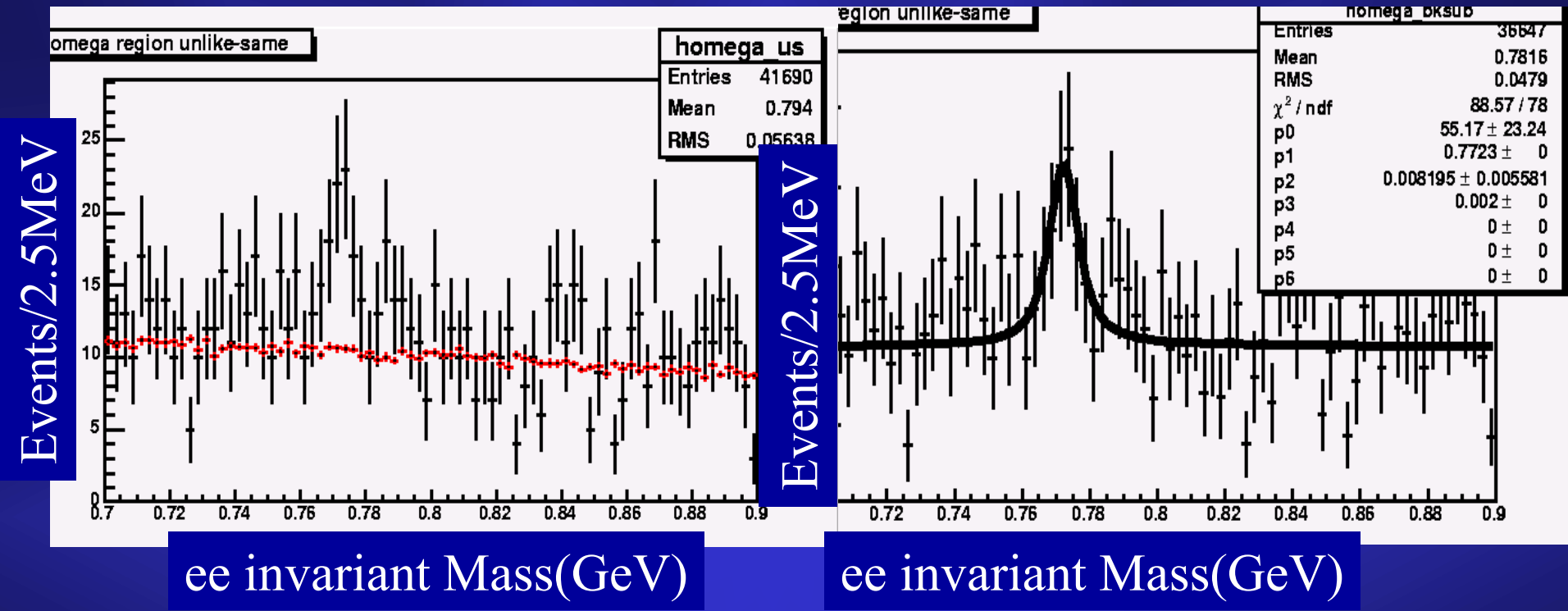
Richard Seto
UCR

Light/Heavy PWG

Aug 28, 2003

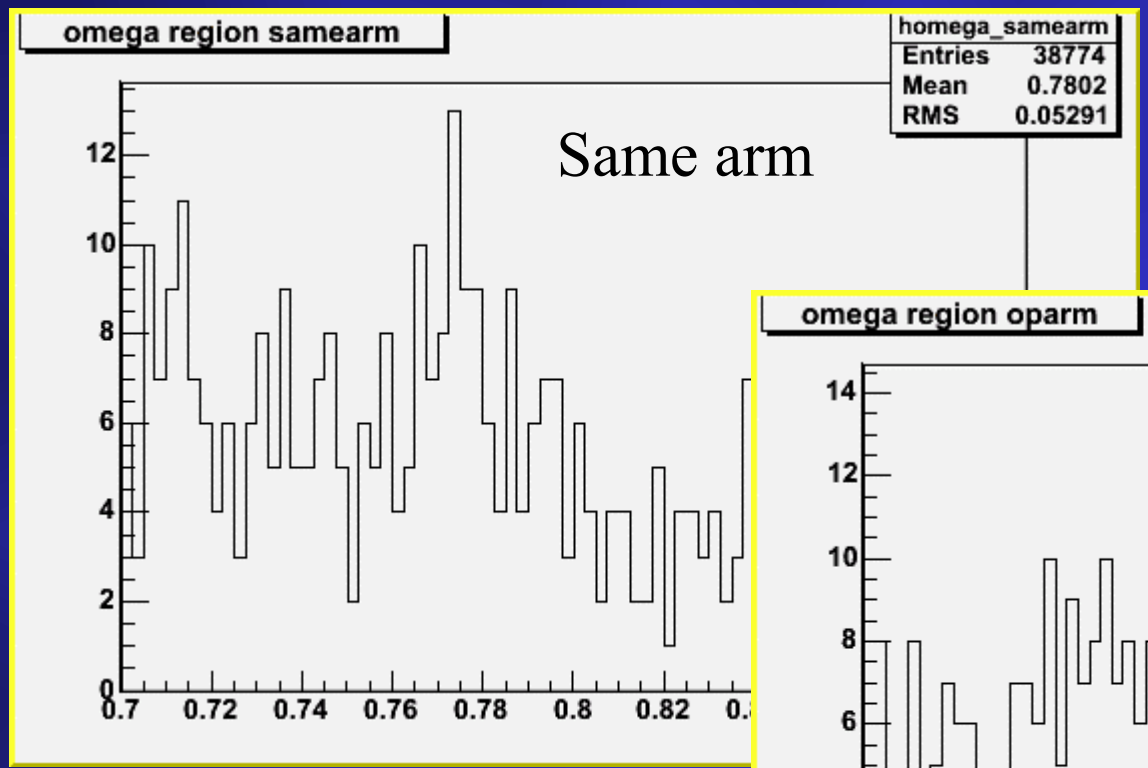
Like sign subtraction – not completely correct

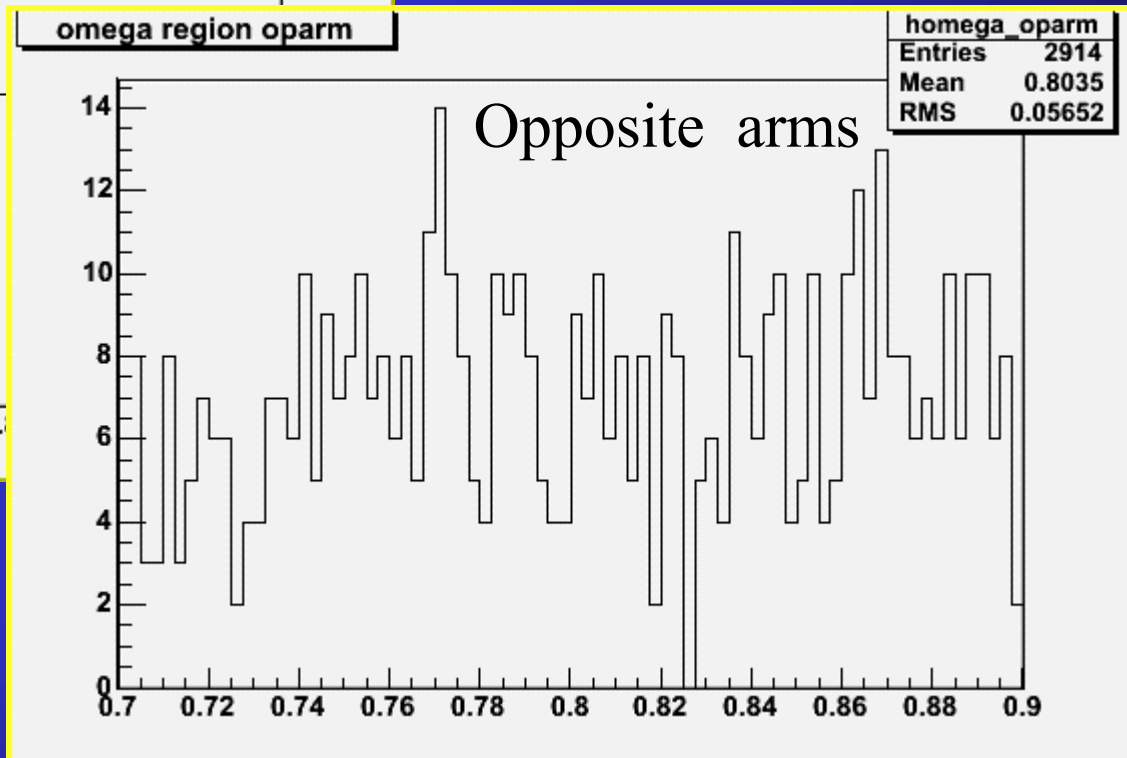
2.5 Mev bins RBW*Gaussian+2 deg polynomial



- ~43 events chisq=89/78
- M=772.3±0.9 Γ= 8±4 σ= 2(fixed) (all in MeV)
- S/B ~ 0.5
- Tight cuts-to do: ① loose cuts ② find phi

~60% are in same arm (ert requires higher energy)





ERT configuration changes

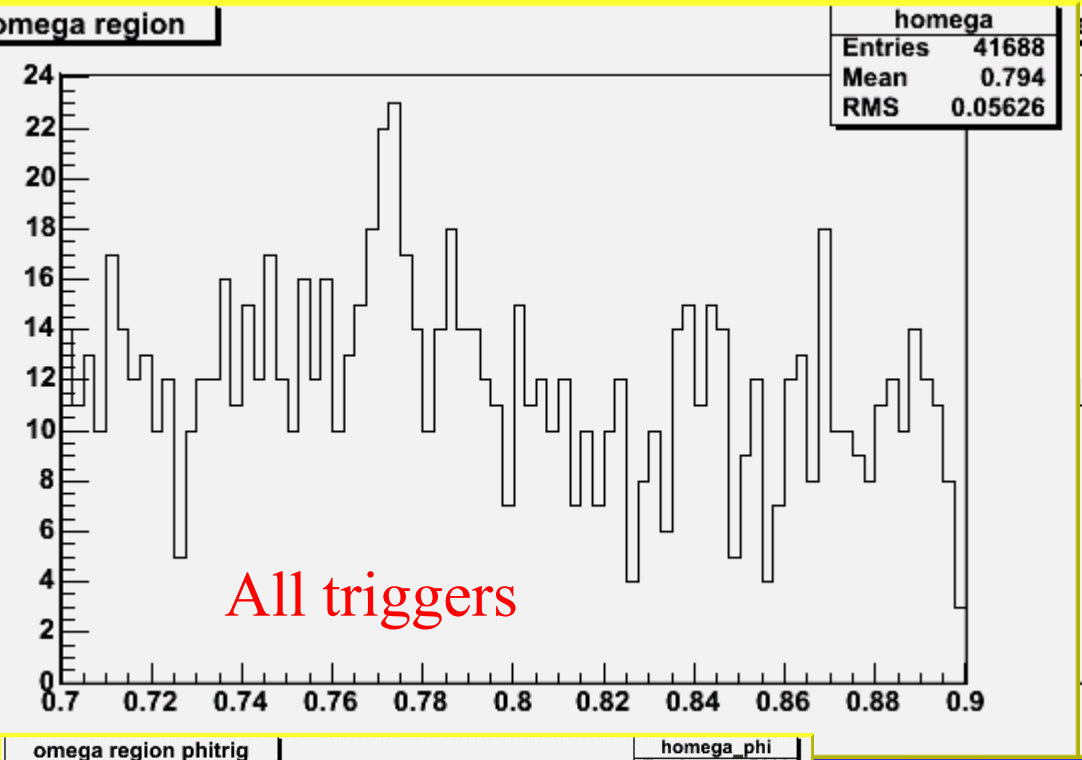
- ERT_electron = 2x2&&RICH (no prescale)
- ERT_phi=2 RICH (~6 prescale)
- 2x2 thresholds (600, 800, 400, 800 MeV)

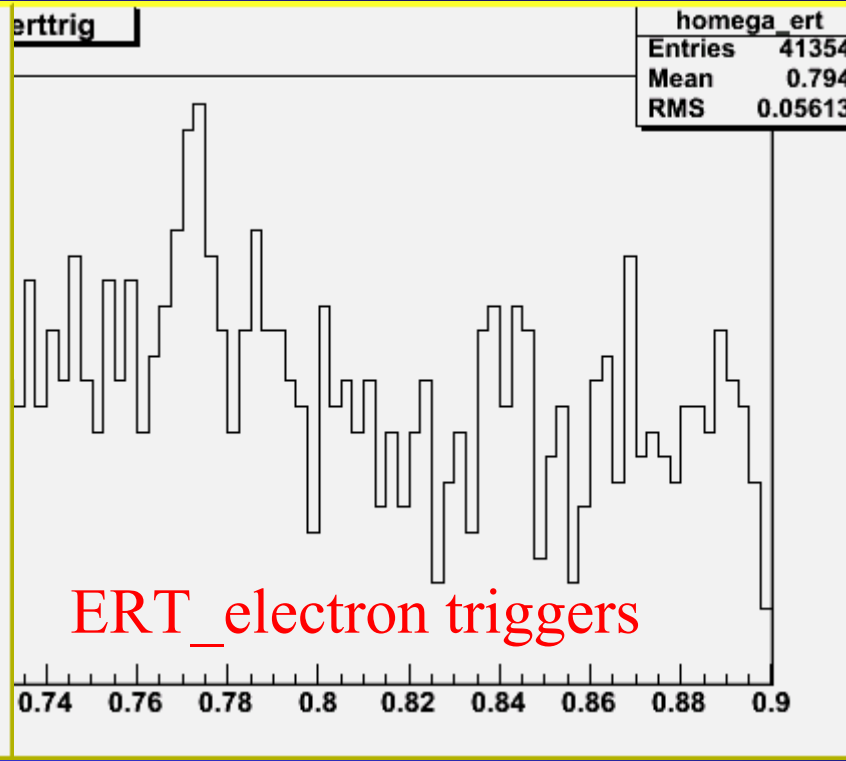
This table gives a brief overview of the thresholds (DAC values) used in Run 3.

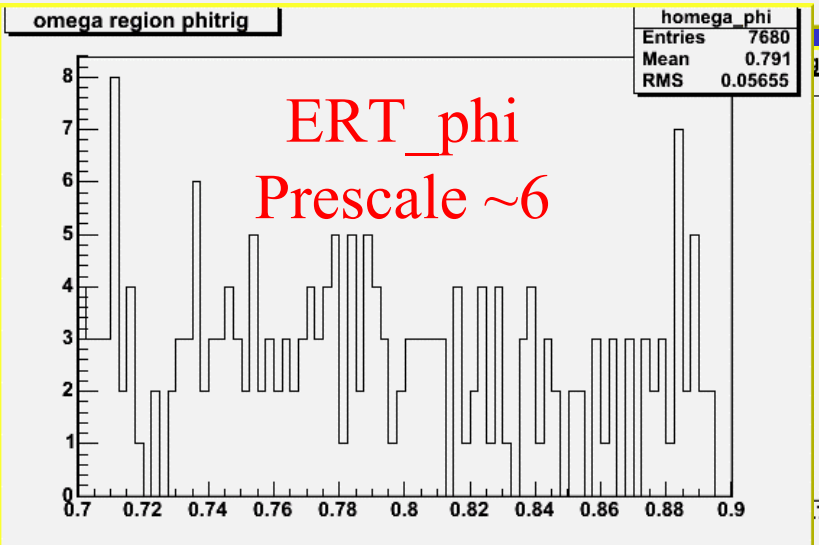
Date	Run	4x4a	4x4b	4x4c	2x2	RICH
05/13/03 18:46	89446	30(29)	31(30)	29(28)	34(34)	920
05/02/03 17:57	87618	30(29)	31(30)	29(28)	24(24)	920
04/28/03 17:38	86768	30(29)	31(30)	29(28)	34(34)	920
03/14/03 17:22	78321	31(31)	32(32)	30(30)	34(34)	920
02/06/03 21:10	70693	31(31)	32(32)	30(30)	29(29)	920
01/23/03 18:23	67219	31(31)	31(31)	30(30)	29(29)	920

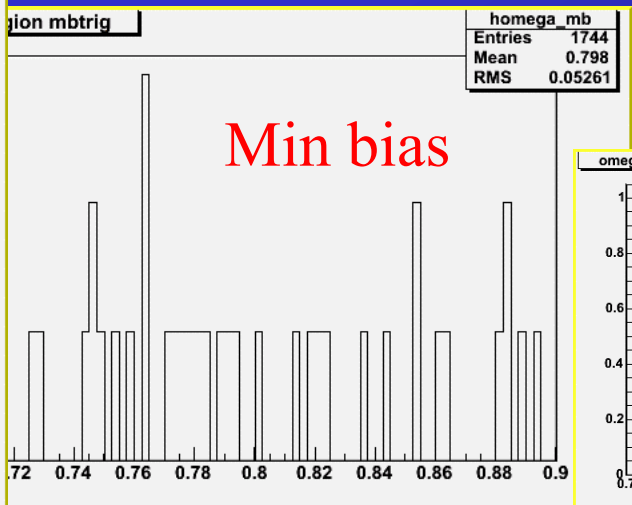
2x2 DAC-values correspond approximately to: 24 = 400 MeV, 29 = 600 MeV and 34 = 800 MeV
4x4 DAC-values correspond approximately to: 29 = 1.4 GeV, 30 = 2.1 GeV , 31 = 2.8 GeV and 32 = 3.5 GeV
RICH4x5 ADC-values correspond approximately to: 920 = 3 p.e.

Omegas come mostly from ERT_electron trigger

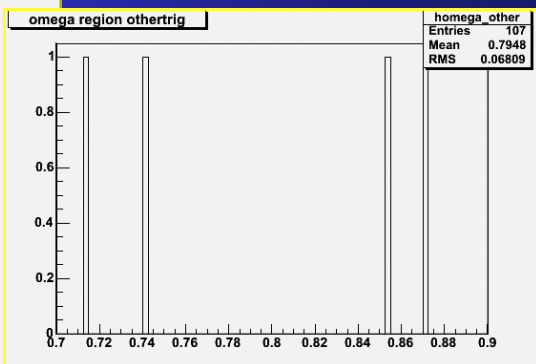








other



Run –3 dA

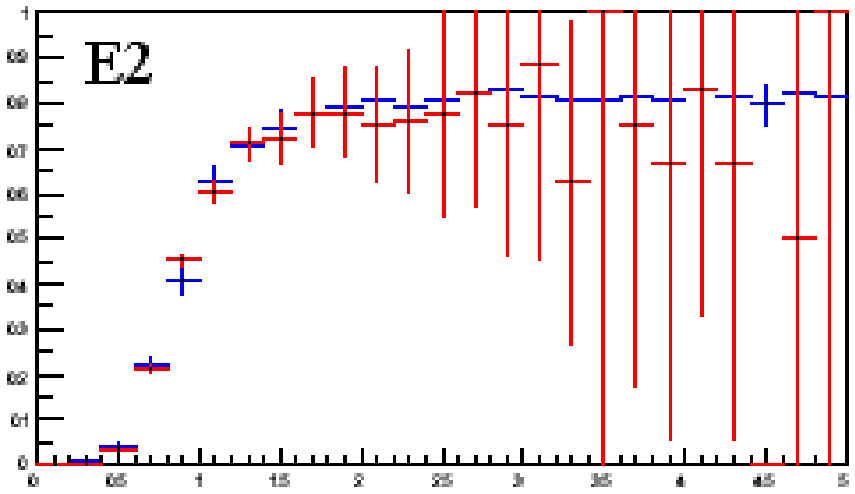
- Threshold for most of the runs at 600 MeV
  - Only exception run 78435 (out of 17 runs, 1/20 of bbcll1 triggers; 1/40 of ert-electron triggers)

- Total run
  - IntLum~2.6/nb
  - 7.4E9 bbcllv1 raw
  - 1.3e8 bbcllv1 recorded
  - 9.5e7 ERT_electron & bbcll1 raw
  - 7.2e7 ERT_electron & bbcll1 recorded
  - 4.8e8 ERT_phi&bbcll1 raw
  - 4.4e7 ERT_phi&bbcll1 recorded

- Pro.39
  - IntLum~?
  - 6.1e8
  - 0.95e7
  - 9.2e6
  - 7.5e6
  - 4.4e7
  - 5.6e6

Pro.39 ~ 10% of data

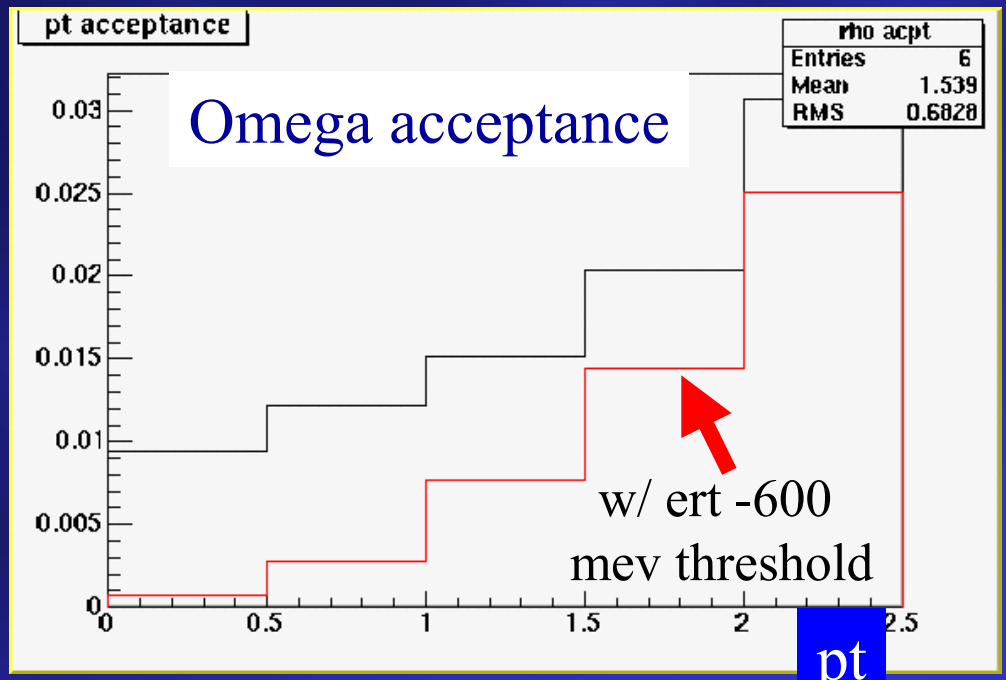
ERT trigger eff (acceptance)

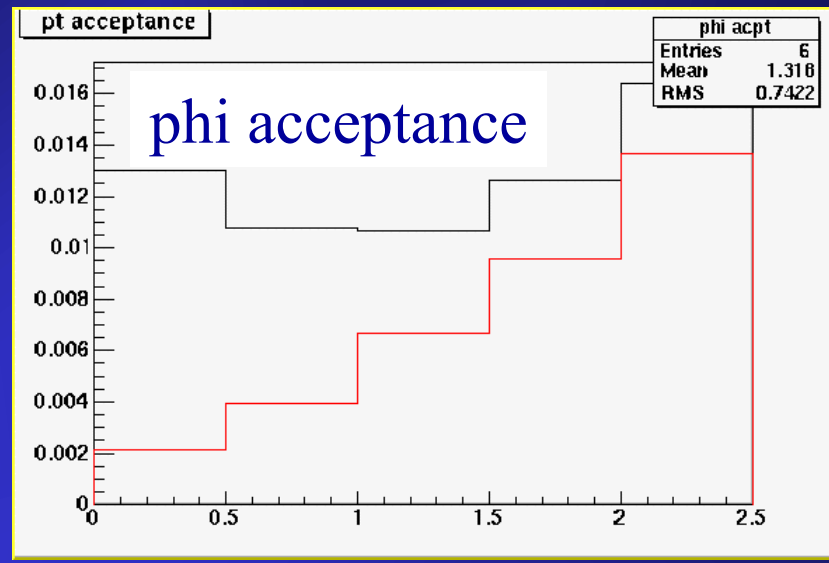


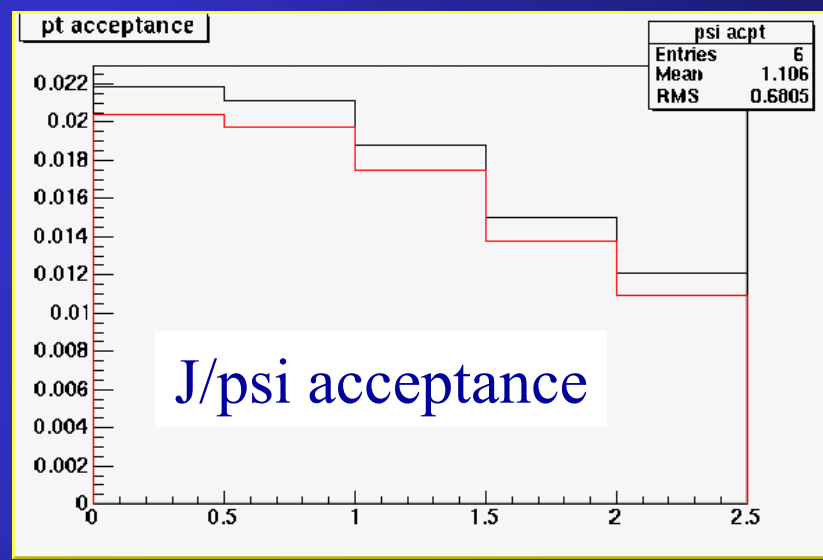
- Put ert_electron turn on into exodus

- Used exponential pt distribution in (with flow)
- Eff omega~ 0.33
- Phi ~0.44
- J/psi ~ .96
  - Maximum since max eff of ert is 80%

Ert: pt acceptance

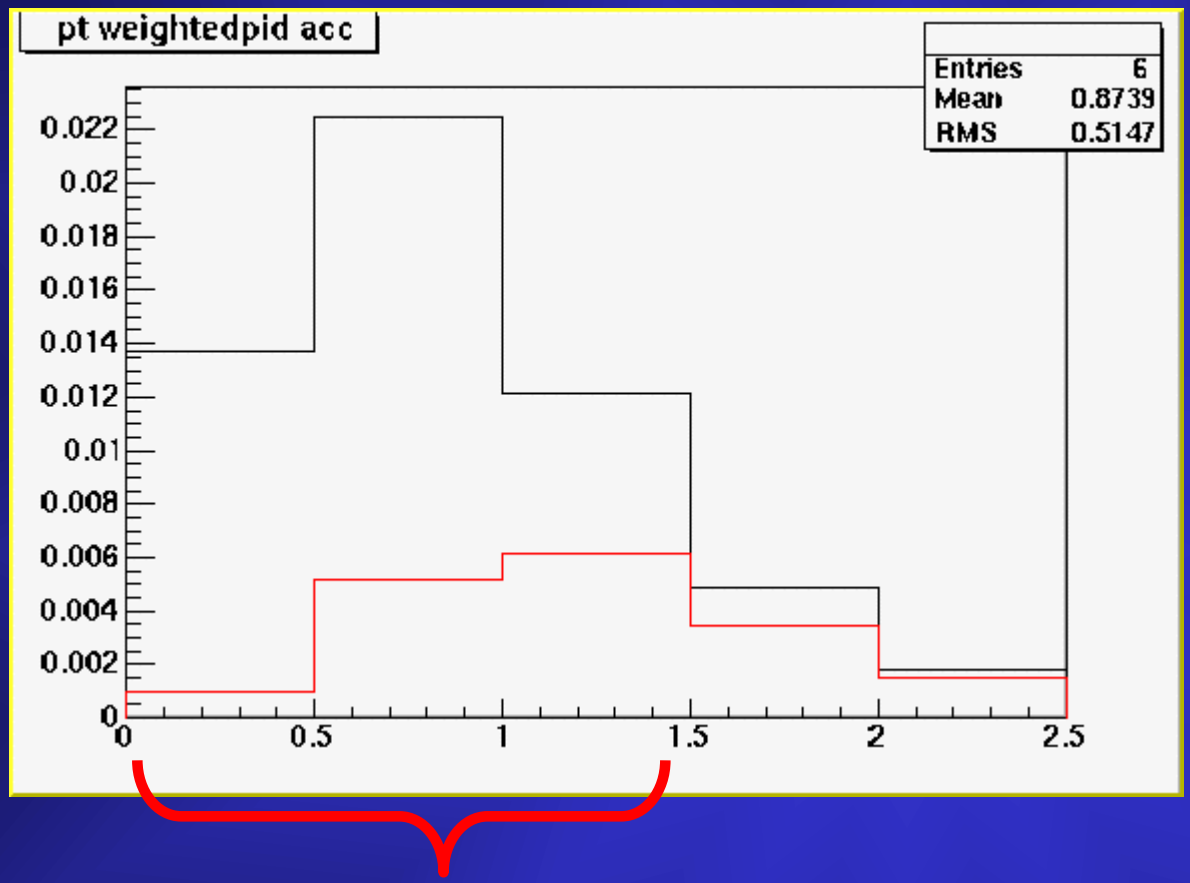






- ERT trigger hurts low pt acceptance for omega/phi
- Little effect on J/psi

Accepted pt distribution (MC guess)



- E625 effect pt<1.5 GeV
- For phenix
  - run 3 data
  - Enough min bias and phi triggers to cover low pt?

Region covered by E625

Rates (dA and AA)

- dA
  - ~ assume 40 omegas (~10% of data)
  - 400 omega for run (2.5/nb)
- To AA
  - Assume min bias (no ert) factor of 3
  - dA Npart~ 8, Au Au-Au min bias npart ~ 109
- Run-4 Au-Au 19wks (intL=0.169 nb-1)
- Cross section dAu~2b, AuAu~6.8b
- 400/.333{ert}*(.169/2.5){lum}(6.8/2){CS}*(109/8){npart}=3300 omegas

Backgrounds

- In dA min bias S/B ~0.5
- Signal scales line npart, Backgound like npart^2 so St/B goes like 1/npart
- S/B is AuAu ~0.5*9/109=.04
- Sources [bkg reduction in AuAu – no MVD barrel]
  - MVD (0.8% X_0) [remove barrel for future runs]
  - Dalitz(0.8)+beampipe(0.3)+air(0.2)=1.3
  - Charm(equivalent to 0.2-.3%)
- Reduction of background in future
  - ((1.3+0.2)/(1.3+0.2+0.8))**2 ~ 1/2.3

➔ S/B in AuAu ~0.1

Significance of signal in dAu vs centrality

centrality	N	S/B	#sig
Mb	400	0.5	10
0-10%	88	0.25	4.7
10-20%	74	0.23	4.1
20-40%	118	0.37	6.6
40-60%	82	0.53	6.6
60-92%	83	1.02	9.2

- Looks ok
- I worry about low pt
- Min bias, and phi trigger (?)

Significance of signal in AuAu vs centrality

centrality	N	S/B	S/B No MVD	#sig No MVD	#sig
Mb	3124	.041	.094	17	11
0-10%	1013	.014	.032	5.7	3.7
10-20%	738	.019	.044	5.7	3.7
20-40%	872	.032	.074	8	5.3
40-60%	374	.075	.18	8	5.3
60-92%	196	.3	1.2	15	7

Notes on numbers in Tony's spread sheet

- Omega's agree, My S/B better after taking the credit for the MVD since I take a narrower window for the background
- Phi – I have now added factor of 2 strangeness enhancement ~ now agrees with spreadsheet
- Note I used data to begin ~ has trigger and reconstruction eff (for dA cf with central AA).
- New spreadsheet at http://www.phenix.bnl.gov/phenix/WWW/p/draft/seto/pwglight/rbup03/rateslvm2.xls

conclusions

- ERT - most omegas come in under this trigger
  - eff for omega ~0.3 - Hurts low pt
  - Pro.39 ~ 10% data,
- ~400 omegas for dAu run
  - Centrality looks ok
- ~3-4k for Au-Au
  - Assuming no MVD barrel-centrality looks OK
- To do
  - Work out pt expectations
  - Loose cuts
  - phi